

Claims

- [c1] 1. A gear reduction apparatus for a bicycle component, wherein the apparatus comprises:
- a gear support;
 - a first gear coupled to the gear support for receiving rotational drive force from a drive component;
 - a second gear coupled to the gear support for communicating rotational drive force to a driven portion of the bicycle component;
 - wherein the first gear is operatively coupled to the second gear to communicate rotational drive force from the drive component to the driven portion of the bicycle component; and
 - wherein the first gear, the second gear and the gear support are coupled together so that the first gear, the second gear and the gear support may be coupled to and removed from the drive component and the driven portion of the bicycle component as a self-contained unit.
- [c2] 2. The apparatus according to claim 1 further comprising a position sensing member operatively coupled to the gear support so as to receive rotational drive force from the drive component.

- [c3] 3. The apparatus according to claim 2 wherein the first gear, the second gear, the position sensing member and the gear support are coupled together so that the first gear, the second gear, the position sensing member and the gear support may be coupled to and removed from the drive component and the driven portion of the bicycle component as a self-contained unit.
- [c4] 4. The apparatus according to claim 3 wherein the position sensing member comprises an optical position sensing member.
- [c5] 5. The apparatus according to claim 3 wherein the position sensing member rotates integrally with the first gear.
- [c6] 6. The apparatus according to claim 5 further comprising a position sensing reduction gear operatively coupled between the first gear and the position sensing member to change a rotation rate between the first gear and the position sensing member.
- [c7] 7. The apparatus according to claim 6 wherein the gear support comprises:
 - a main support that supports at least one of the first gear and the second gear; and
 - a position sensing support that is detachably mounted to

the main support, wherein the position sensing support supports the position sensing reduction gear so that the position sensing support and the position sensing reduction gear may be removed from the main support as a self-contained unit.

- [c8] 8. The apparatus according to claim 7 wherein the position sensing support supports the position sensing reduction gear and the position sensing member so that the position sensing support, the position sensing reduction gear and the position sensing member may be removed from the main support as a self-contained unit.
- [c9] 9. The apparatus according to claim 8 wherein the main support supports the first gear and the second gear.
- [c10] 10. The apparatus according to claim 1 wherein the drive component comprises an electric motor with a drive shaft for communicating rotational power to the first gear.
- [c11] 11. The apparatus according to claim 10 wherein the gear support includes a drive shaft receiving member for receiving the drive shaft.
- [c12] 12. The apparatus according to claim 11 wherein the drive shaft receiving member includes a drive shaft receiving opening for receiving the drive shaft

therethrough.

- [c13] 13. The apparatus according to claim 1 wherein the bicycle electrical component comprises an electrical derailleur.
- [c14] 14. The apparatus according to claim 13 wherein the gear support is structured to mount to a base member of the derailleur.
- [c15] 15. The apparatus according to claim 14 wherein the driven portion comprises a link driving member that drives a link that couples the base member to a movable member supporting a chain guide.
- [c16] 16. The apparatus according to claim 15 wherein the link driving member comprises a link driving gear that engages the second gear.
- [c17] 17. The apparatus according to claim 16 wherein the gear support is structured to be mounted within the base member.
- [c18] 18. The apparatus according to claim 1 wherein the gear support is made of a plastic material.
- [c19] 19. The apparatus according to claim 1 wherein the gear support comprises a plurality of gear support parts.

- [c20] 20. The apparatus according to claim 19 wherein the plurality of gear support parts are made of a plastic material.
- [c21] 21. A gear reduction apparatus for a bicycle electrical component, wherein the apparatus comprises:
a gear support;
a first gear coupled to the gear support for receiving rotational drive force from a drive component;
a second gear coupled to the gear support for engaging a driven portion of the bicycle component;
wherein the first gear is operatively coupled to the second gear to communicate rotational drive force from the drive component to the driven portion of the bicycle component; and
wherein the first gear and the second gear are supported in the gear support by plastic gear support parts.